Role Reversal:
What if surfaces could fight bacteria instead of harboring germs?

Description:

Hospitals and other healthcare systems go to great lengths to ensure that their facilities are both a welcoming and **safe** environment. However, it is estimated that 1.7 million people get an infection during their hospital stay every year, and newer literature supports the connection of environmental bacteria[1]. Traditional environmental cleaning protocols and infection prevention strategies have proven over reliant on limited human interventions, so the **surface hygiene** of care delivery sites remains a global healthcare threat. Allied Bioscience has developed *SurfaceWise*™, an invisible, non-tacky treatment for most surfaces that would create a hostile environment for bacteria and last for months instead of minutes.

Aim Statement:

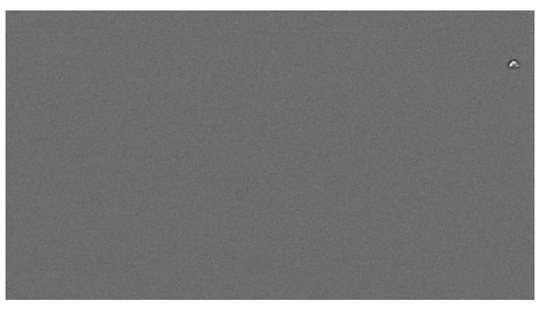
To determine if a polymer coating could be long lasting while also decreasing microbial burden.

Actions Taken:

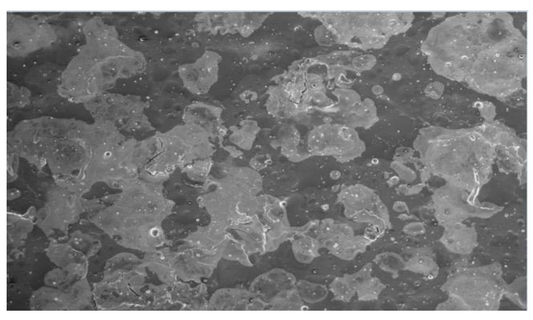
To address the aim statement, three actions were performed and results observed. The first included a microscopic examination of the polymer after being applied to a surface, the second included durability testing after repeated bleach cleanings, and the last included testing on how the polymer impacts surface bacterial burden.

Results:

First, testing was done to see how the polymer appeared on a glass surface. To observe this, nanoscopic views of uncoated glass were obtained through an electron microscope. Additional images were taken of glass which had been coated with the polymer. See below.

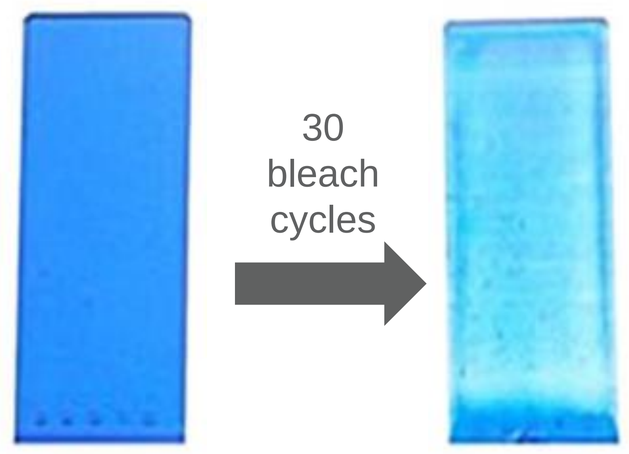


Untreated glass



Treated glass

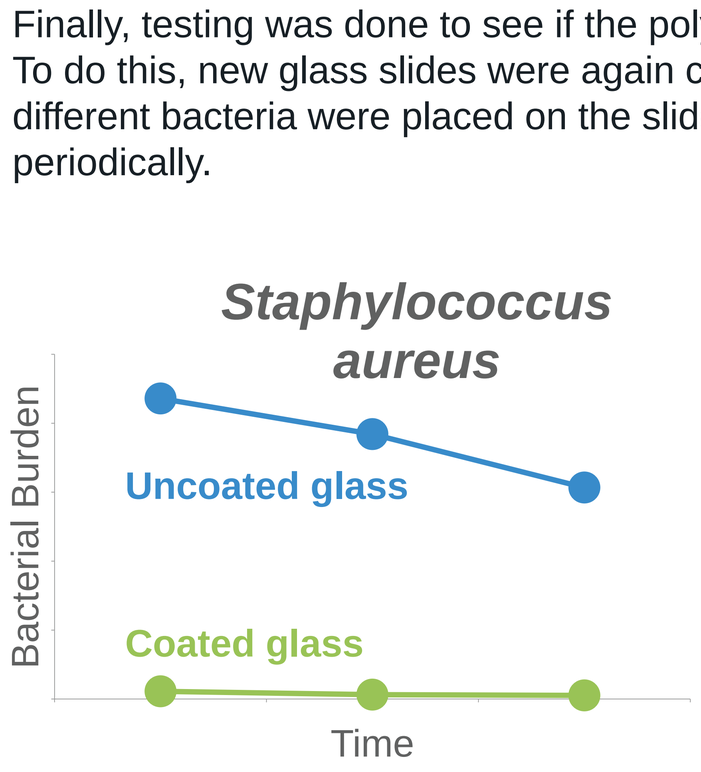
Second, testing was done to see if the polymer would be long lasting. To do this, a glass slide was first coated with the polymer and then stained blue. After that, another glass slide was coated, then subjected to 30 bleach cleanings, and then stained blue. See left.

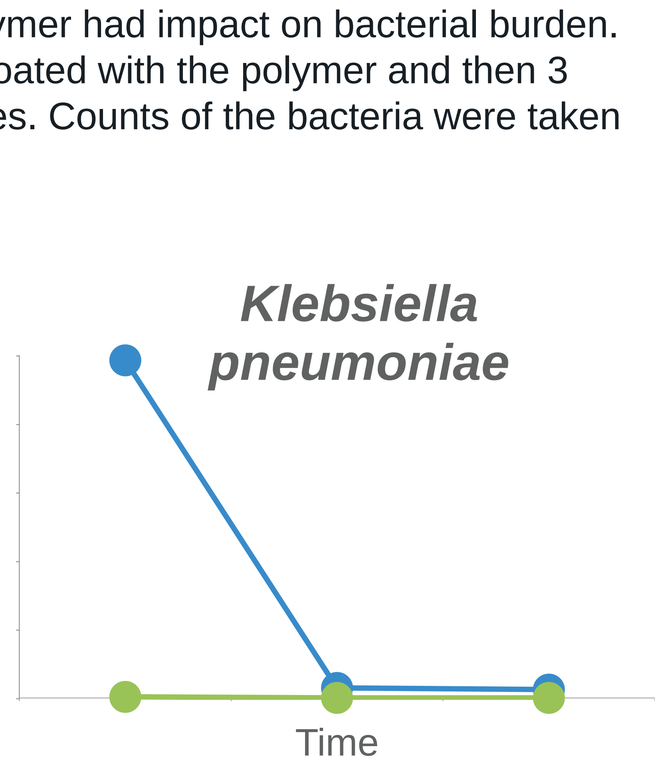


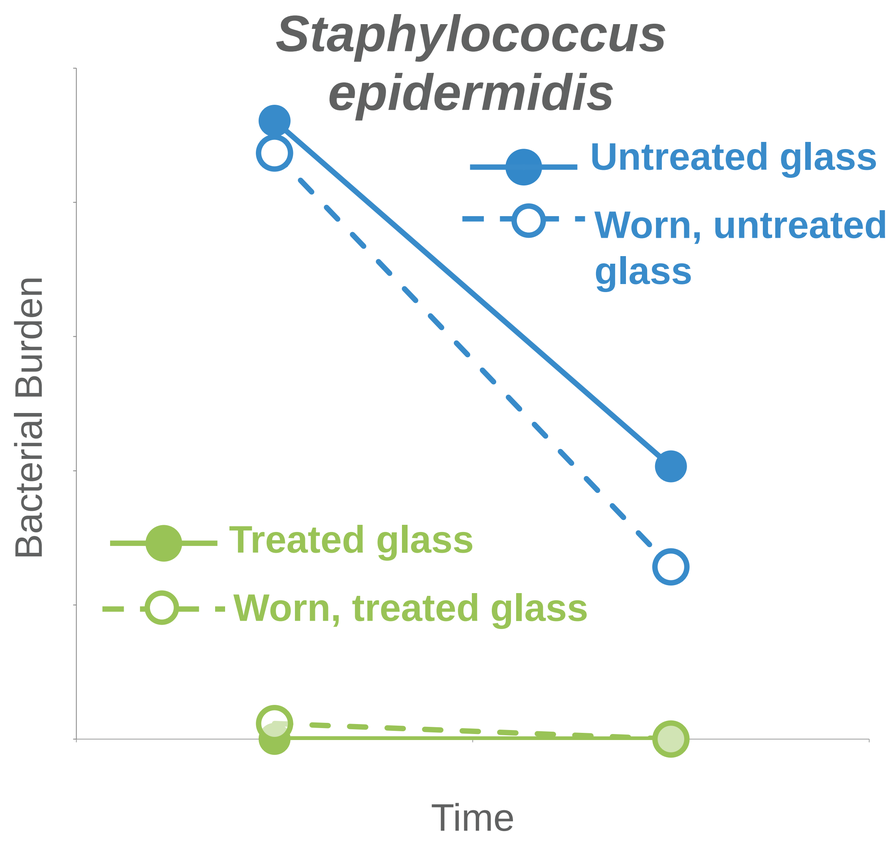
Treated glass

Treated glass after bleach

Finally, testing was done to see if the polymer had impact on bacterial burden. To do this, new glass slides were again coated with the polymer and then 3 different bacteria were placed on the slides. Counts of the bacteria were taken periodically.







Summary of Results:

The above measures demonstrate the presence, hardiness, and a microbiostatic* effect of this novel polymer coating. Most importantly, the polymer coating was observed to decrease the counts of different bacteria, including *Staphylococcus aureus*, but it could also stand up to aggressive cleaning regimen, such as with bleach. Notably, while *Klebsiella pneumoniae* bacteria do have limited life on surfaces, the coated surface was found to be impactful in decreasing its presence even at initial contact.

**A microbiostatic coating is a coating that inhibits the growth of odor causing bacteria and fungi (mold or mildew), bacteria and fungi (mold or mildew) which cause staining and discoloration, and algae. This product does not protect users or others against food-borne or disease-causing bacteria or fungi.*

Next Steps:

Additional research is needed to determine the possible impact for in vivo environmental bacterial burden as well as clinical benefit. Current results are promising and warrant further exploration.

Allied BioScience
Break the Chain

References:

1. Otter, Johnathan A. et al. “Evidence that contaminated surfaces contribute to the transmission of hospital pathogens and an overview of strategies to address contaminated surfaces in hospital settings”. *American Journal of Infection Control*. May 2013. Vol 41, Issue 5, Supplement, Pages S6-S11.